

## Two new species of the subgenus *Stilobezzia* (*Stilobezzia*) KIEFFER from Peruvian Amazonia (Diptera: Ceratopogonidae)

by

C.C. Cazorla, G.R. Spinelli & F. Díaz

Lic. Carla C. Cazorla, Dr. Gustavo R. Spinelli & Lic. Florentina Díaz, División Entomología, Museo de La Plata, Paseo del Bosque s/n, 1900 La Plata, Argentina; e-mail: carlacazorla@fcnym.unlp.edu.ar & spinelli@fcnym.unlp.edu.ar

(Accepted for publication: October, 2005).

### Abstract

Adult and pupa of *Stilobezzia* (*Stilobezzia*) *merceri* CAZORLA & SPINELLI, n.sp. from Iquitos, and adult of *Stilobezzia* (*S.*) *williamsi* C. & S., n.sp. from Pagoreni, Cuzco, are described and illustrated. These species are compared with the similar congeners *S. (S.) bicolor* LANE and *S. (S.) modesta* LANE, and *S. (S.) simplex* LANE & FORATTINI, respectively.

Keywords: *Stilobezzia*, new species, Peru, adult, pupa.

### Resumen

Se describen e ilustran el adulto y la pupa de *Stilobezzia* (*Stilobezzia*) *merceri* CAZORLA & SPINELLI, n.sp. de Iquitos, y el adulto de *Stilobezzia* (*S.*) *williamsi* C. & S., n.sp. de Pagoreni, Cuzco. Estas especies son comparadas con sus congéneres *S. (S.) bicolor* LANE y *S. (S.) modesta* LANE, y *S. (S.) simplex* LANE & FORATTINI, respectivamente.

### Introduction

*Stilobezzia* KIEFFER is a large and diverse genus of Ceratopogonidae. Adult females are important predators on other small insects and immatures are found in a wide variety of aquatic and semiaquatic habitats, including streams, lake and pond margins, puddles, swamps, rice fields, rock pools, and tree holes (DE MEILLON & WIRTH 1991; CAZORLA & MARINO 2004).

BORKENT & WIRTH (1997), in the World catalog of the Ceratopogonidae, listed 310 extant species of *Stilobezzia*. Four subgenera are included within the genus, the cosmopolitans *Stilobezzia* KIEFFER and *Acanthohelea* KIEFFER, *Debenhamia* WIRTH & GROGAN, restricted to Australia, and *Eukraiohelea* INGRAM & MACFIE, from Africa, America, southeast Asia and India.

According to the Neotropical catalog of the Ceratopogonidae (BORKENT & SPINELLI 2000), 64 species inhabit the region, 42 in the subgenus *S. (Stilobezzia)*, 18 in *S. (Acanthohelea)*, and 4 *S. (Eukraiohelea)*. Most of the information on these species was published by KIEFFER (1917) for Paraguay, INGRAM & MACFIE (1931) for Patagonia, LANE (1947), LANE & FORATTINI (1956, 1958, 1961) and LANE et al. (1955) mainly from southeastern Brazil, and SPINELLI (1983) recorded species from

eastern Argentina. It is worth remarking and surprising that only 5 species are recorded in Amazonia: *S. (A.) amazonica* CLASTRIER, *S. (A.) manaosensis* LANE & FORATTINI, *S. (E.) amnigena* (MACFIE), *S. (S.) beckae* WIRTH, and *S. (S.) punctulata* LANE.

During the last years, several collectings trips were performed to different places in the Peruvian Amazonia, resulting in a large collection of ceratopogonids which is being studied in the Museo de La Plata, Argentina. The purpose of this paper is to give the first results of this study, describing 2 new species of the subgenus *Stilobezzia* (*Stilobezzia*).

LANE & FORATTINI (1961) provide a key for the identification of all Neotropical species of the genus except the Patagonian *Stilobezzia (Acanthohelea)* spp. described by INGRAM & MACFIE (1931). However, many clue characters in this key, especially those related to coloration, are very difficult to recognize in alcohol preserved and posteriorly slide mounted specimens, and consequently both options of the dicotomic key have to be checked. For this reason the use of this key is troublesome, and we refused to consult it during the present study.

### Material and methods

Floating pupae of *S. merceri* were collected from a sample containing mud and the hydrophytes *Pistia stratiotes* L. and *Nymphaea* sp. from a small pond. They were isolated in a vial with a drop of water and observed daily in the laboratory till adult emergence. Adults of *S. williamsi* were collected at light. Pupa an adults were slide mounted in Canada balsam, and examined, measured and drawn using binocular compound microscope with attached camera lucida. The following measurements for pupae were taken and/or calculated: pedicel length (P), respiratory organ length (PRH), pedicel/ respiratory organ ratio (P/H), operculum length (OL), operculum width (OW), operculum ratio (OW/OL), anal segment length, anal segment width. For pupal terminology see BORKENT & CRAIG (2001), and the Manual of Nearctic Diptera (MCALPINE et al. 1981) for adults.

The holotype and allotype of the new species are deposited in the collection of the Museo Nacional de Historia Natural, Lima, Perú (MHNL); paratypes are deposited in the collection of the Museo de La Plata, Argentina (MLP).

### Results

#### *Stilobezzia (S.) merceri* CAZORLA & SPINELLI, n.sp. (Figs. 1-15)

**Diagnosis.** A brown species of the subgenus *Stilobezzia (Stilobezzia)* distinguished by the following combination of characters: third palpal segment with scattered sensilla on surface; wing membrane without spots; one ovoid spermatheca; mesal inner margin of gonocoxite with two processes, proximal one larger, strong, triangular, directed posteriorly; distal portion of parameres nearly straight, directed laterally at apex; aedeagal sclerites sinuate, slender.

**Description of male.** Similar to female with usual sexual differences. Wing length 1.30 (1.24-1.36, n = 2) mm; width 0.38 (0.34-0.42, n = 2) mm; CR 0.71 (n = 2). Genitalia (Fig. 1): tergite 9 extending to apex of gonocoxite, rounded distally; cercus stout; sternite 9 short, with shallow, broad posteromedial excavation. Gonocoxite stout, 2.28 x longer than greatest breadth, mesal inner margin with two processes, proximal one larger, strong, triangular, directed posteriorly, distal one blunt; gonostylus 1.6 x shorter than gonocoxite, moderately curved, tip pointed. Parameres (Fig. 2) separate, subparallel, with strong basal apodemes, distal portion nearly straight, directed laterally

at apex, tip pointed. Aedeagus (Fig. 2) represented by two slender, sinuate, subparallel sclerites with short curved basal arms, extreme tip pointed.

Female. Head pale brown. Eyes bare, narrowly separated. Flagellum (Fig. 3) pale brown, flagellomeres 1-8 bottle-shaped, 9-13 elongated; AR 1.56 (1.55-1.58,  $n = 2$ ). Palpus (Fig. 4) dark brown; third segment moderately slender with scattered sensilla on surface; PR 3.32 (3.00-3.75,  $n = 3$ ). Mandible with 7 ( $n = 3$ ) teeth.

Thorax: scutum uniformly dark brown. Legs brown, mid and hindlegs darker; foretibia broadly pale except tip brown, hindtibia with subapical pale ring; tarsi pale, tarsomeres 1-2 of fore and midlegs with one row of ventral palisade setae, in two rows on tarsomeres 1-2 of hindleg; hind tibial comb with 8 spines; tarsomere 5 in all legs with one pair of basal, blunt spines arising from common base; claws large with basal inner tooth, longer in midleg. Wing (Fig. 5) length 1.30 (1.24-1.34  $n = 3$ ) mm; width 0.43 (0.41-0.46,  $n = 3$ ) mm; CR 0.70 ( $n = 3$ ); membrane slightly infuscated, without brown spots, petiole of vein M 4 x the length of crossvein r-m, second radial cell 5 x the length of the first. Halter stem pale, knob dark brown.

Abdomen: segments 1-7 uniformly dark brown, 8-10 paler. One spermatheca, ovoid with short neck (Fig. 6), measuring 0.065 ( $n = 2$ ) by 0.050 ( $n = 2$ ) mm, neck 0.007 mm, width 0.007 mm ( $n = 2$ ).

Pupa. Exuvia pale brown. Cephalothoracic tubercles as follows: 2 anterodorsal setae (ad) (Fig. 7) with rounded base, two setae, one long, stout, other long, thin; 2 dorsolateral setae (dl) (Fig. 8) with raised base, two setae, one stout, medium-sized, other long, thin; 2 dorsomedial setae (dm) (Fig. 9), one base raised with stout, long seta, other pore. Thorax smooth, with medial crest extending between respiratory organs; 4 dorsal sensilla (d) (Fig. 10), three with long, thin setae, one with minute seta; 2 ventromedian setae (vm) (Fig. 11), represented by pores; 2 ventrolateral setae (vl) (Fig. 11), one thin, medium-sized, other minute seta. Respiratory organ (Fig. 12) pale brown except distal portion, directed anteriorly, straight with blunt apex, integument smooth, 7-9 apical spiracles, 2 posterolateral, each one situated on tubercle, pedicel smooth, long, stout, PRH 0.30 (0.30-0.31,  $n = 3$ ) mm; P 0.14 (0.12-0.14,  $n = 3$ ) mm; P/H = 0.47 (0.38-0.57,  $n = 3$ ). Operculum (Fig. 13) broader than long, disk smooth, well-developed, strong, spur-like anteromarginal seta (am) located on tubercle; OL 0.14 (0.13-0.14,  $n = 2$ ) mm; OW 0.22 (0.21-0.22,  $n = 2$ ) mm; OW/OL = 1.57 (1.50-1.64,  $n = 2$ ). Abdominal segments integument with few scattered small spinules at base. Fourth abdominal segment (Fig. 14) tubercles as follows: 3 dorsoposteromarginal tubercles (dpm), i, ii, base rounded, iii large, conical, with additional pore at base, i pore, ii with minute seta, iii with short, stout seta; 2 dorsal anterosubmarginal tubercles (dasm), i small, triangular, with medium-sized, thin seta, ii small, base rounded with minute, stout seta; 2 lateral posteromarginal tubercles (lpm), i small, base rounded, with medium-sized, thin seta, ii large, conical, with long, stout seta; 4 ventroposteromarginal tubercles (vpm), i, ii, large, conical, serrate, with short, stout setae, iii, iv, base raised, iii with two thin setae, one small, other medium-sized, iv with short, thin seta; 2 lateral anterosubmarginal tubercles (lasm), both base rounded with minute, stout seta. Anal segment (segment 9) of female (Fig. 15) length 0.17 (0.16-0.20,  $n = 3$ ) mm; width 0.18 (0.17-0.20,  $n = 3$ ) mm; dorsal surface densely covered with posteriorly directed, pointed spicules only at base; apicolateral process triangular smooth, with wide base, slender, directed laterally, extreme tips darkish. Anal segment of male as in female, length 0.21 (0.20-0.23,  $n = 2$ ) mm; width 0.22 ( $n = 2$ ) mm.

## Distribution

Known only from its type-locality.

Types: Holotype male, allotype female (collected as pupae, reared in laboratory), Perú, Iquitos, Quistococha, 13-VIII-1996, G. SPINELLI. Paratypes, 1 male with pupal exuviae, 2 females with pupal exuviae, same data as type.

Derivation of specific epithet. This species is named after Dr. Randy MERCER for his kindness during the collection of the specimens herein described, and for his collaboration providing information on the hydrophytes present in the Iquitos pond.

## Taxonomic discussion

The male genitalia of *S. merceri* n.sp. is very similar to the one of *S. bicolor* LANE, from Panama to eastern Argentina, especially by the shape of the parameres and by the gonocoxite with mesal inner processes, the proximal one large and triangular. It differs, however, by the aedeagus nearly straight, only slightly curved at the extreme apex. Besides, the legs of *S. bicolor* are yellowish and the petiole of vein M is only twice as long as crossvein r-m.

The female of *S. merceri* also resembles the female of *S. modesta* LANE, from southeastern Brazil, by virtue of the scutum uniformly dark brown and the wings without brown spots, but differs from this species by having legs dark brown (yellowish in *modesta*), abdominal segments 1-7 brown and 8-10 paler (all dark brown in *modesta*) and by the length of the first radial cells (minute in *modesta*). The male of *S. modesta* is unknown.

The pupa of *S. merceri* is also very similar to the one of *S. bicolor*, which was incompletely described by FORATTINI & RABELLO (1956), omitting any reference to the cephalothoracic tubercles and only briefly mentioning the tubercles of the fourth abdominal segment. However, the respiratory organ in *S. bicolor* lacks posterolateral tubercles and its distal portion is darker.

### *Stilobezzia williamsi* CAZORLA & SPINELLI, n.sp. (Figs. 16-22)

Diagnosis. A yellowish brown species of the subgenus *Stilobezzia* (*Stilobezzia*) distinguished by the following combination of characters: third palpal segment with shallow subapical pit; anterolateral areas of scutum brown; wing membrane without spots; gonostylus stout, nearly straight; distal portion of parameres with subapical, inner, slightly sclerotized, posteromesally directed process; aedeagal sclerites stout, recurved, extending from the level of distal half of gonocoxite.

Male. Similar to female with usual sexual differences. Wing length 1.35 (1.26-1.40,  $n = 4$ ) mm; width 0.41 (0.40-0.44,  $n = 4$ ) mm; CR 0.75 (0.74-0.75,  $n = 4$ ). Genitalia (Fig. 16): tergite 9 tapering to blunt tip; sternite 9 with deep, rounded posteromedial excavation. Gonocoxite stout, 1.34 x longer than greatest breadth; gonostylus slightly longer than gonocoxite, stout, nearly straight, extreme tip slightly recurved, blunt. Parameres (Fig. 17) separate, each with stout, bilobed apodeme, knob rounded, distal portion strongly sclerotized, contiguous proximally, slightly divergent distally with subapical inner, slightly sclerotized, posteromesally directed process. Aedeagus (Fig. 18) represented by a pair of recurved sclerites, extending from level of distal half of gonocoxite, each with stout basal portion and a pair of outer, mesal, pointed teeth, apex pointed.

Female. Head brown. Eyes bare, narrowly separated. Flagellum (Fig. 19) uniformly brown, AR 1.24 (1.24-1.25,  $n = 3$ ). Palpus (Fig. 20) pale brown; third segment with shallow subapical pit; PR 3.16 (2.90-3.88,  $n = 4$ ). Mandible with 7-8 ( $n = 4$ ) teeth.

Thorax. Scutum yellowish brown, anterolateral areas brown; scutellum yellowish

brown; postscutellum brown on mid portion, sides yellowish brown. Pleura yellowish brown, subalar sclerites darkish. Legs yellowish brown; narrow apex of hind femur brown; tarsi yellowish brown; hind tibial comb with 7-8 spines (n = 4); tarsomere 1 of hindleg with two rows of palisade setae; claws large with basal inner tooth, equal in all legs. Wing (Fig. 21) length 1.63 (1.58-1.70, n = 4) mm; width 0.56 (n = 4) mm; CR 0.81 (0.78-0.82, n = 4); hyaline, petiole of vein M as long as the length of crossvein r-m, first radial cell 3.5 x the length of second radial cell. Halter stem pale, knob dark.

Abdomen: segments 1-7 and 10 withish, 8-9 brown. Two ovoid spermatheca with sclerotized short necks (Fig. 22), slightly unequal, measuring 0.090 (n = 4) by 0.070 (n = 4) mm, and 0.080 (n = 4) by 0.056 (n = 4) mm; rudimentary third present.

### Distribution

Known only from its type-locality.

Types: Holotype male, allotype female, Perú, Cuzco, PAGORENI, 15-II-2004, at light. Paratypes, 3males, 4 females, same data as types.

Derivation of specific epithet. This species is named after Prof. Jorge WILLIAMS, herpetologist of the Museo de La Plata, in recognition of his valuable help collecting ceratopogonids in the Peruvian Amazon rain forest.

### Taxonomic discussion

The male genitalia of *S. williamsi* is very similar to the one of *S. simplex* LANE & FORATTINI from Panama, especially in the shape of aedeagal sclerites and parameres. However, the aedeagal sclerites of *S. simplex* lack the outer mesal teeth and the parameres apodemes are slender, less developed, and its posterior process is stouter, posteriorly directed. *Stilobezzia simplex* also shows many extragenital differences with respect to this new species, e.g., postscutellum blackish brown, very reduced first radial cell, petiole of vein M 3 times longer than crossvein r-m, apex of tibiae brown, and abdominal tergites blackish.

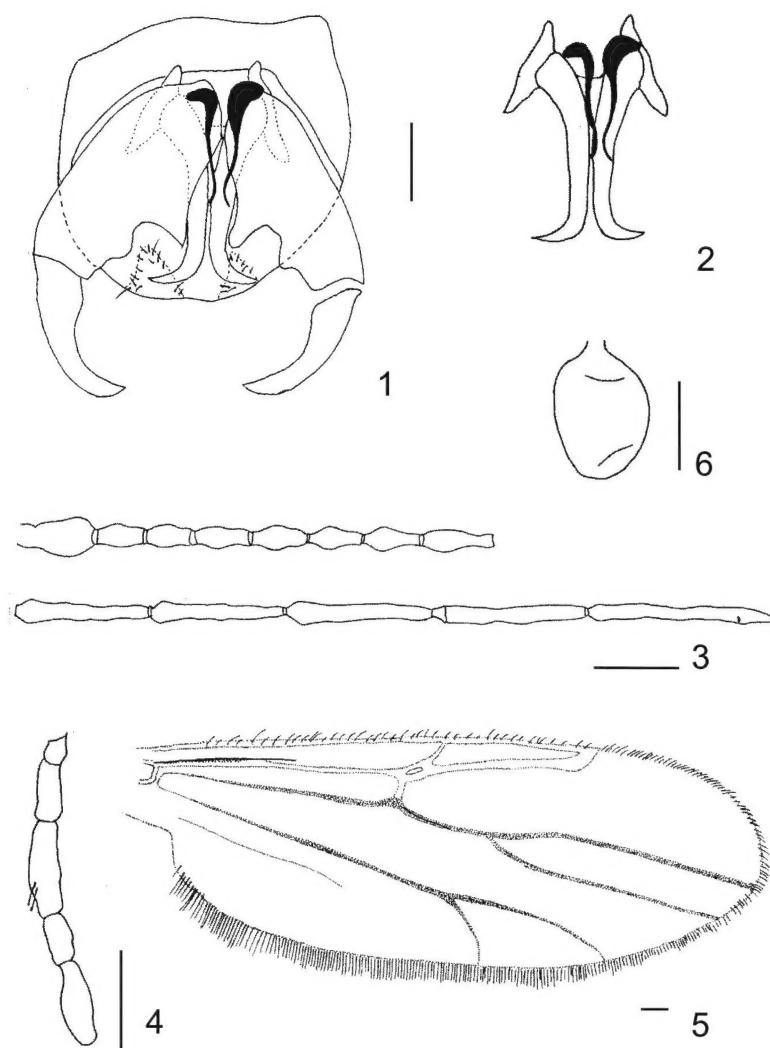
### Acknowledgments

We gratefully acknowledge Pluspetrol Perú Corporation S.A. and ERM Perú S.A. for the financial support of the fieldwork in Pagoreni, Cuzco, which was carried out during the environmental impact assessment of block 56.

### References

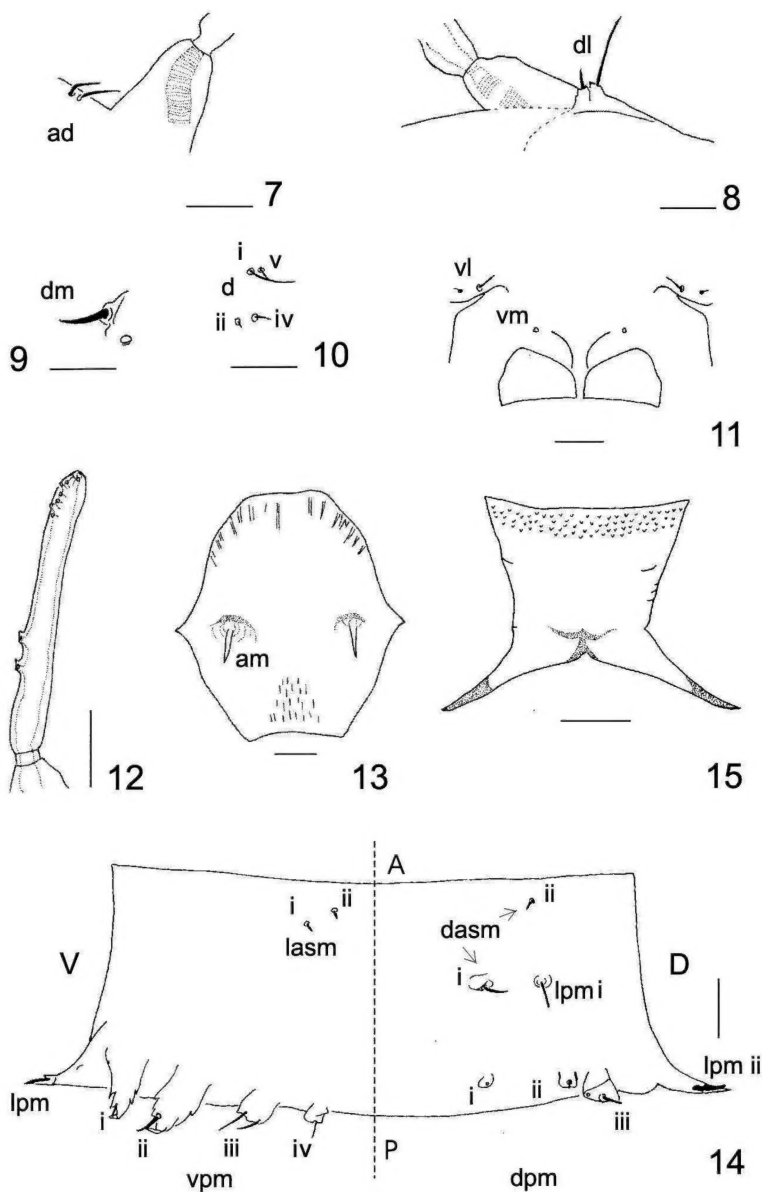
- BORKENT, A. & D.A. CRAIG (2001): Submerged *Stilobezzia rabelloi* LANE (Diptera: Ceratopogonidae) pupae obtain oxygen from the aquatic fern *Salvinia minima* BAKER. - Proc. Entomol. Soc. Wash. **103**(3): 655-665.
- BORKENT, A. & G.R. SPINELLI (2000): Catalog of the New World biting midges south of the United States of America (Diptera: Ceratopogonidae). - Contrib. Ent. Internatl. **4**(1): 1-107.
- BORKENT, A. & W.W. WIRTH (1997): World species of biting midges (Diptera: Ceratopogonidae). - Bull. Amer. Mus. Nat. Hist. **233**: 1-257.
- CAZORLA, C. & P.I. MARINO (2004): The pupa of *Stilobezzia punctulata* LANE from Peruvian Amazonia (Diptera: Ceratopogonidae). - Amazoniana **18**(1/2): 75-80.
- DE MEILLON, B. & W.W. WIRTH (1991): The genera and subgenera (excluding Culicoides) of the Afrotropical biting midges (Diptera: Ceratopogonidae). - Ann. Natal Mus. **32**: 27-147.
- FORATTINI, O.P. & E.X. RABELLO (1956): As formas imaturas de *Culicoides guyanensis* FLOCH & ABONNENC 1942 e de algumas espécies de *Stilobezzia* (Diptera, Ceratopogonidae). - Rev. Brasil. Entom. **6**: 43-49.

- INGRAM, A. & J.W.S. MACFIE (1931): Ceratopogonidae. - In: Diptera of Patagonia and South Chile. Part II, fasc. 4: 155- 232.
- KIEFFER, J. (1917): Chironomides d'Amérique conservés au Musée National Hongrois de Budapest.- Ann. Hist.Nat. Mus. Nation. Hungarici **15**: 292-364.
- LANE, J. (1947): Espécies Brasileiras de *Stilobezzia* (Dipt. Ceratopogonidae) e *Zygoneura stonei* nov. nom (Dipt. Mycetophilidae). - Rev. Bras. Entom. **18**: 197-214.
- LANE, J. & O.P. FORATTINI (1956): Neotropical *Stilobezzia* KIEFFER, 1911 I. Nine new Panamanian species. (Diptera, Nematocera, Ceratopogonidae). - Rev. Bras. Malariolog. **8**: 207-226.
- LANE, J. & O.P. FORATTINI (1958): Neotropical *Stilobezzia* II. Fourteen new species, chiefly from Panama (Diptera Ceratopogonidae). - Rev. Brasil. Entom. **8**: 203-224.
- LANE, J. & O.P. FORATTINI (1961): Neotropical *Stilobezzia* III. Key for the adults of this genus and description of one new species ( Diptera: Ceratopogonidae). - Rev. Brasil. Entom. **10**: 83-94.
- LANE, J., FORATTINI, O.P. & E.X. RABELLO (1955): Biología e espécies novas de *Palpomyia* e *Stilobezzia* (Diptera, Nematocera, Ceratopogonidae). - Dusenía **6**: 81-88.
- MCALPINE, J., PETERSON, B., SHEWELL, G.E., TESKEY, H.J., VOCKEROTH, J.R. & D.M. WOOD (1981): Manual of Nearctic Diptera. I. - Agric. Canada Monogr. **27**: 1-674.
- SPINELLI, G.R. (1983): Notas sobre Ceratopogonidae (Diptera, Nematocera) de la República Argentina I. Una nueva especie del género *Alluaudomyia* KIEFFER, redescrición de *Dasyhelea penthesileae* MACFIE, y nuevas citas para el género *Stilobezzia* KIEFFER. - Limnobiós **2**: 403-411.



Figs. 1-6:

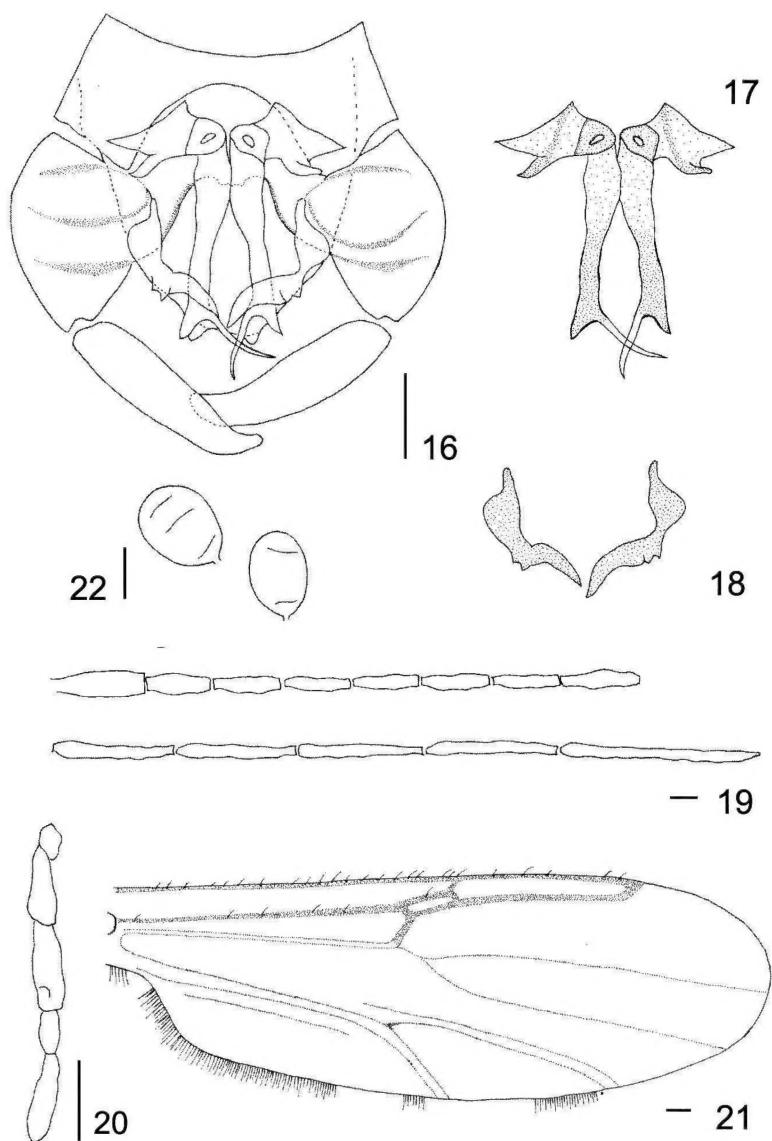
*Stilobezzia merceri*, n.sp., adult. 1-2: male; 3-6, female. 1: genitalia; 2: parameres and aedeagus; 3: flagellum; 4: maxillary palpus; 5: wing; 6: spermatheca (scale bars: 0.05 mm).



Figs. 7-15:

*Stilobezzia merceri*, n.sp., pupa. 7: anterodorsal setae (ad); 8: dorsolateral setae (dl); 9: dorsomedial seta (dm); 10: dorsal sensilla (d); 11: ventromedian setae (vm) and ventrolateral setae (vl); 12: respiratory organ; 13: operculum and anteromarginal seta (am); 14: fourth abdominal segment with detail of dorsoposteromarginal tubercles (dpm), dorsal anterosubmarginal tubercles (dasm), lateral posteromarginal tubercles (lpm), ventroposteromarginal tubercles (vpm), and lateral anterosubmarginal tubercles (lasm); 15: anal segment (scale bars: 0.05 mm).





Figs. 16-22:

*Stilobezzia williamsi*, n.sp., adult. 16-18: male; 19-22: female. 16: genitalia; 17: parameres; 18: aedeagus; 19: flagellum; 20: maxillary palpus; 21: wing; 22: spermathecae (scale bars: 0.05 mm).

